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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/724,882
Filing Date: December 02, 2003
Appellant(s): UETANI ET AL.

Keiko K. Takagi
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed on 01/25/10 appealing from the Office action mailed on 06/24/09.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 2003/0064282 A1	Nakagawa et al.	02-2003
WO 01/75991	Nakagawa et al.	10-2001
JP 2002-110245	Yuji et al.	04-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. **Claims 1-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yuji et al. (JP 2002-110245-machine translation provided by the Examiner) in view of Nakagawa et al. (WO01/75991). US 2003/0064282A1 to Nakagawa et al. is relied upon as an equivalent document for convenience.**
2. Regarding claim 1, Yuji discloses a lithium ion secondary battery, which uses a solid polymer electrolyte (abstract, page 6) and a liquid crosslinkable composition for

the solid electrolyte (0001). The liquid crosslinkable composition for the solid electrolytes of Yuji et al. comprises radically polymerizable monomers of oxetane ring containing monomer and epoxy group containing monomer (0011). Moreover Yuji teaches a battery separator (0004). Additionally, Yuji teaches that the liquid crosslinkable composition containing oxetane group and epoxy group is injected into the airtight container, which has units such as electrodes and separator (0020). The liquid composition infiltrates into gaps such as electrode and a separator (0020).

3. With respect to claim 1, it is noted that the reference of Yuji discloses same crosslinking polymer containing cation-polymerizable functional group selected from the group consisting of 3-oetanyl group and epoxy as claimed by applicant.

4. The difference between the invention of Yuji and the presently claimed invention is that Yuji does not explicitly teach "a crosslinking polymer layer formed on the porous film substrate so as to be in contact with the porous film substrate **consisting of** a crosslinking polymer layer...cation." as claimed. Specifically, Yuji does not teach coating of the aforementioned crosslinking polymer onto a porous film substrate. Instead, Yuji discloses injection of the crosslinking polymer along with cationic initiator, electrolyte solvent and lithium electrolyte salt into the airtight container (i.e. battery), which has units such as electrodes and battery separator (see claim 19).

5. However, Nakagawa teaches that as a method for inhibiting liquid electrolyte leakage there is known a method, which comprises incorporating a crosslinkable monomer in a liquid electrolyte, subjecting the liquid electrolyte to crosslinking reaction to produce a jelly solidified gel electrolyte, and then using the solid electrolyte comprising a solidified liquid electrolyte singly or in combination with a substrate as a separator (0004). According to Nakagawa such method has disadvantage because in the case of such a gel electrolyte, ions move through the gel at a very low rate than in the liquid electrolyte, easily causing an increase of internal resistivity of battery and drop of high rate discharge capacity. The resulting battery shows insufficient battery properties (0005). To overcome these disadvantages Nakagawa teaches a separator for battery prepared by impregnating or coating a porous material (porous film/membrane) with a monomer solution comprising crosslinkable monomer (0071).

6. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the porous film of Nakagawa as a battery separator in the invention of Yuji and form a crosslinking polymer layer of Yuji on the porous film as taught by Nakagawa, motivated by the desire to avoid increase of internal resistivity of a battery and drop of high rate discharge capacity.

7. Regarding claim 2, the oxetane ring containing monomer of Yuji contains 3-oxetanyl group (0013).

8. With respect to claim 3, the liquid crosslinkable composition contains the other radically polymerizable monomer (claim 2). Further, Yuji teaches the claimed formula III on pages 27 and 28, which reads on the methacrylate monomer as represented by formula III as claimed.
9. Regarding claim 4, Yuji teaches that the quantity of the radically polymerizable monomer with oxetane ring and another radically polymerizable monomer is 5 to 50% by weight (claims 2 and 3).
10. With respect to claim 5, Yuji discloses that the quantity of the radically polymerizable monomer having epoxy group and the other radically polymerizable monomer is 5 to 50% by weight (claims 4 and 5).
11. Regarding claims 6 and 7, Yuji discloses the claimed 3-oxetanyl group containing (meth) acrylate formula (I) on page 25 and claimed epoxy group containing (meth) acrylate formula (II) on pages 26 and 27 respectively.
12. Regarding claim 9, Yuji is silent as to teaching of porous film substrate having a thickness of 3 to 50 μm and a porosity of 30 to 95%. However, the invention of Nakagawa is previously disclosed. Nakagawa discloses that the thickness of the porous material (porous film/membrane) is not greater than 30 μm (0069) and the porous material has porosity of 50% (0106). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the porous film substrate of Nakagawa with the thickness and porosity as taught by Nakagawa as a battery separator in the invention of Yuji, motivated by the desire to provide a suitable battery separator.

(10) Response to Argument

Argument A

13. On page 10 of the brief, appellants argue "It is respectfully submitted that there is no motivation to modify JP'245 as proposed by the Examiner, based on Nakagawa, to arrive at the claimed invention."

14. In response, the Examiner submits that the motivation to combine Nakagawa with JP'245 is provided on page 5, section 10 of 06/24/09 Office action. Specifically the motivation is "Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the porous film of Nakagawa as a battery separator in the invention of Yuji and form a crosslinking polymer layer of Yuji on the porous film as taught by Nakagawa, motivated by the desire to avoid increase of internal resistivity of a battery and drop of high rate discharge capacity." Accordingly, appellants arguments that there is no motivation to modify JP'245 based on Nakagawa as proposed by the Examiner is not found persuasive.

Argument B

15. On pages 10-11 of the brief, appellants argue that "It is submitted that if JP'245 were modified as proposed by the Examiner, the result would be a "crosslinked" layer as opposed to a "crosslinking" layer as recited in claim 1, since Nakagawa teaches the

use of a "crosslinked" layer. In this regard, the Examiner asserts that "before the polymer is crosslinked it is clearly a crosslinking polymer." However, Nakagawa teaches that a crosslinkable monomer solution is coated on the porous material. Thus, prior to crosslinking, the layer is a crosslinkable monomer, not a crosslinkable polymer, as recited in claim 1." (see page 11). Additionally, appellants argue " In addition, the benefits" of using the method of Nakagawa is based on the "crosslinked" material layer formed on the porous material. That is, Nakagawa discloses that in order to overcome the disadvantages of the prior art, a separator for a battery comprising a crosslinked material layer...Based on such teaching in Nakagawa, one of ordinary skill in the art would not be motivated to form a crosslinkable polymer layer." (see page 11 of the brief).

16. The Examiner respectfully disagrees. It is submitted that even if Nakagawa applies a crosslinking monomer solution on a porous substrate prior to crosslinking, the purpose of Nakagawa is to show that it is known in the art to coat a composition that contains polymerizable species onto a porous film substrate. Additionally, the Examiner submits that the composition of crosslinking polymer of presently claimed invention is already disclosed by the primary reference of JP'245 (see e.g. 0011, 0013, pages 27-28). JP'245 does not teach **coating** of the aforementioned crosslinking polymer onto a porous film substrate and a porous film substrate. Instead, JP'245 discloses injection of the crosslinking polymer along with cationic initiator, electrolyte solvent and lithium electrolyte salt into the airtight container (i.e. battery), which has units such as

electrodes and battery separator (see claim 19). Secondary reference of Nakagawa is in the same field of endeavor as that of JP'245, namely in the field of battery and battery separator. Nakagawa is relied upon to merely teach a use of porous film substrate as a battery separator and to show that it would have been obvious to coat a composition that includes a polymerizable species; regardless of whether it is a monomer or polymer onto a porous film substrate. Additionally, Nakagawa in paragraph 0005 provides a motivation to coat a composition onto a porous film substrate, specifically to avoid the increase of internal resistivity of a battery and drop of high rate discharge capacity (see 0004-0005). Accordingly, appellants' arguments are not found persuasive.

17. Additionally, as to appellants arguments relating to the benefits of using Nakagawa's method, said arguments are not commensurate in scope with the basis of the rejection given that the basis of the rejection is to render obvious appellants' claimed intermediate situation as being obvious, given that the presently claimed invention requires presence of a **crosslinking** polymer layer (note appellants do not claim a **crosslinked polymer** layer). The Examiner submits that one of ordinary skill in the art would recognize that in the finished product (i.e. when the battery containing a crosslinking polymer-supported porous film as a battery separator is assembled) one of ordinary skill in the art would **crosslink** the polymer layer in order to avoid bleeding of the electrolyte.

Argument C

18. On page 11 of the brief (see last full paragraph) appellants assert that "Furthermore, JP'245 teaches that the oxetane ring containing polymer is crosslinked to form a crosslinked material (gel). Specifically, JP'245 discloses that...Additionally, in JP'245, it is preferable that there is no bleeding of the electrolyte from the gel..." Based on this, appellants conclude that if JP'245 were modified to have an uncrosslinked material, it would be rendered inoperable for its intended purpose (see page 12 first full paragraph of the brief).

19. The Examiner respectfully disagrees. As set forth previously, it is submitted that, appellants' arguments are not commensurate in scope with the basis of the rejection given that the basis of the rejection is to render obvious appellants' claimed intermediate situation as being obvious, given that the presently claimed invention requires presence of a **crosslinking** polymer layer (note appellants do not claim a **crosslinked polymer** layer). The Examiner submits that one of ordinary skill in the art would recognize that in the finished product (i.e. when the battery containing a crosslinking polymer-supported porous film as a battery separator is assembled) one of ordinary skill in the art would **crosslink** the polymer layer in order to avoid bleeding of the electrolyte. However, before such crosslinking occurs, the polymer would clearly necessarily be a crosslinking (not crosslinked) polymer as claimed. Accordingly, appellants' arguments are not found persuasive.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Anish Desai/

Examiner, Art Unit 1794

Conferees:

/Christopher A. Fiorilla/

Chris Fiorilla

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